

CLAIMS

What is claimed is:

1. A microelectromechanical optical switching apparatus for redirecting an incident light beam, comprising:
 - (a) a stage formed on a substrate, with the stage being rotatable about an axis which is substantially perpendicular to a major surface of the substrate;
 - (b) a mirror formed on the stage in an initial position which is substantially parallel to the major surface of the substrate, with the mirror being subsequently moveable to an erected position which is oriented substantially perpendicular to the major surface of the substrate; and
 - (c) an electrostatic actuator operatively coupled to rotate the stage and thereby redirect the incident light beam.
2. The apparatus of Claim 1 wherein the substrate comprises silicon.
3. The apparatus of Claim 1 further comprising an electrically-severable fuze for attaching the mirror to the substrate in the initial position.
4. The apparatus of Claim 1 further comprising a hinged frame for moving the mirror to the erected position.
5. The apparatus of Claim 1 wherein the mirror is locked in the erected position by a latch formed on the stage.
6. The apparatus of Claim 5 wherein the latch includes a spring to urge the latch into contact with the mirror and thereby lock the mirror in the erected position.
7. The apparatus of Claim 1 wherein the stage includes a plurality of teeth formed proximate to an outer edge of the stage.
8. The apparatus of Claim 1 wherein the mirror comprises two interconnected layers of polycrystalline silicon.
9. The apparatus of Claim 1 wherein the electrostatic actuator is operatively coupled to rotate the stage with a reciprocating shuttle which includes a pair of teeth which engage with a plurality of opposing teeth formed on the stage proximate to an outer edge thereof.

10. The apparatus of Claim 1 wherein the electrostatic actuator comprises an electrostatic comb actuator.
11. A microelectromechanical optical switching apparatus for redirecting an incident light beam, comprising:
 - (a) a stage formed on a substrate, with the stage being rotatable about an axis which is substantially perpendicular to a major surface of the substrate;
 - (b) a mirror formed on the stage in an initial position which is substantially parallel to the major surface of the substrate, with the mirror being subsequently erectable to an erected position with a light-reflecting surface of the mirror being oriented at an angle to the major surface of the substrate;
 - (c) a hinged frame formed proximate to mirror to move the mirror from the initial position to the erected position;
 - (d) an electrically-severable fuze attaching one end of the mirror to the substrate during fabrication thereof, with the mirror being releasable for movement after the fuze is electrically severed by an electrical current; and
 - (e) an electrostatic actuator operatively coupled to rotate the stage and thereby redirect the light beam when the light beam is incident on the light-reflecting surface of the mirror.
12. The apparatus of Claim 11 wherein the substrate comprises silicon.
13. The apparatus of Claim 11 wherein the mirror is locked in the erected position by a latch formed on the stage.
14. The apparatus of Claim 11 wherein the electrostatic actuator comprises an electrostatic comb actuator.
15. The apparatus of Claim 14 wherein the electrostatic comb actuator is operatively coupled to rotate the stage with a reciprocating shuttle which includes a pair of teeth which engage with a plurality of opposing teeth formed on the stage proximate to an outer edge thereof.
16. The apparatus of Claim 11 wherein the mirror in the erected position is oriented at an angle substantially equal to 90° with respect to the major surface of the substrate.